

FIG. 1

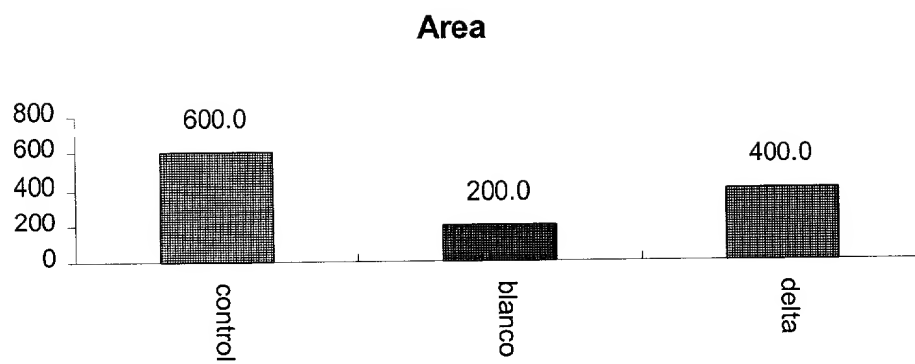


FIG. 2

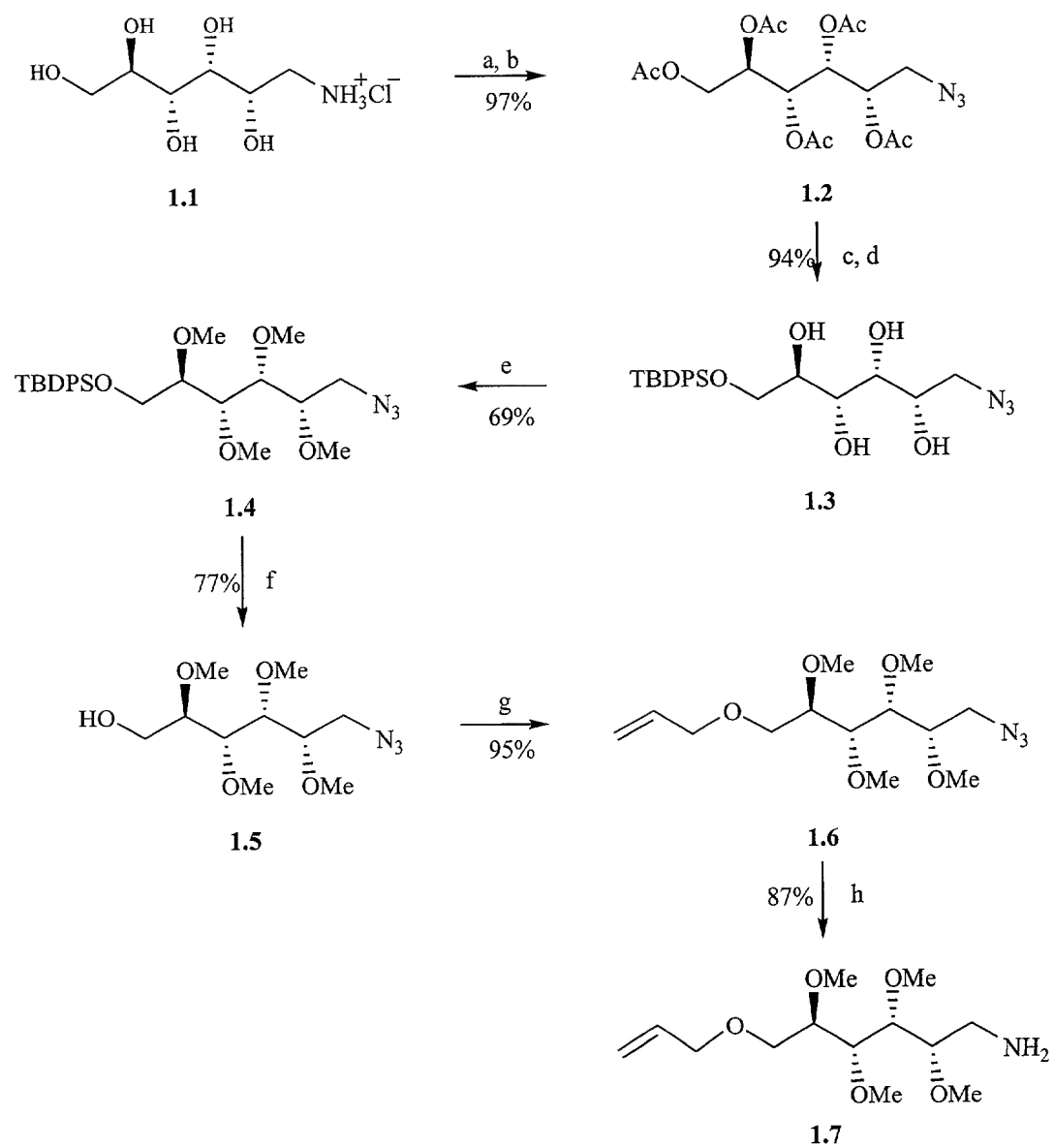


FIG. 3

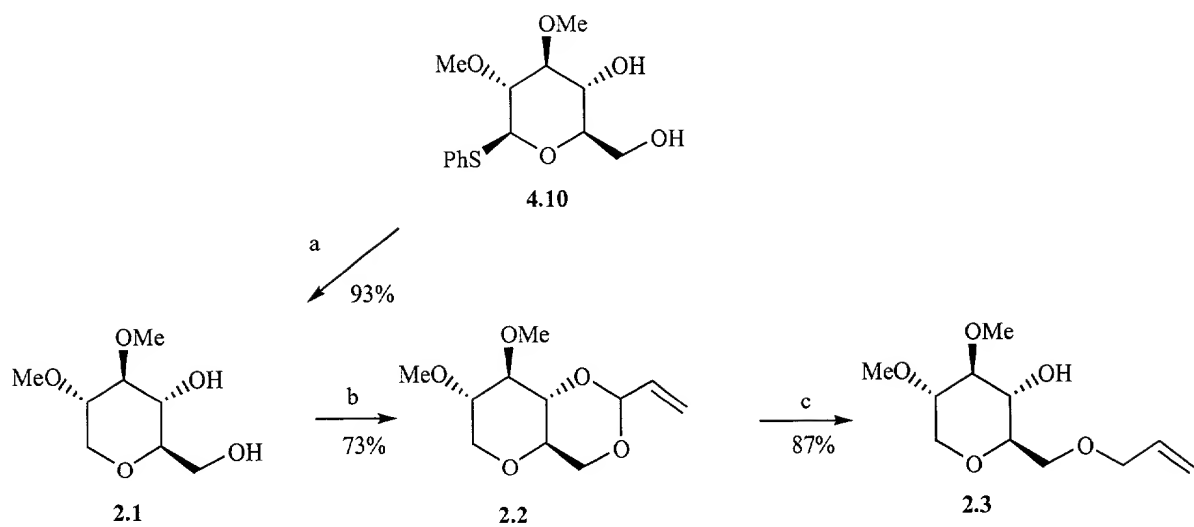


FIG. 4

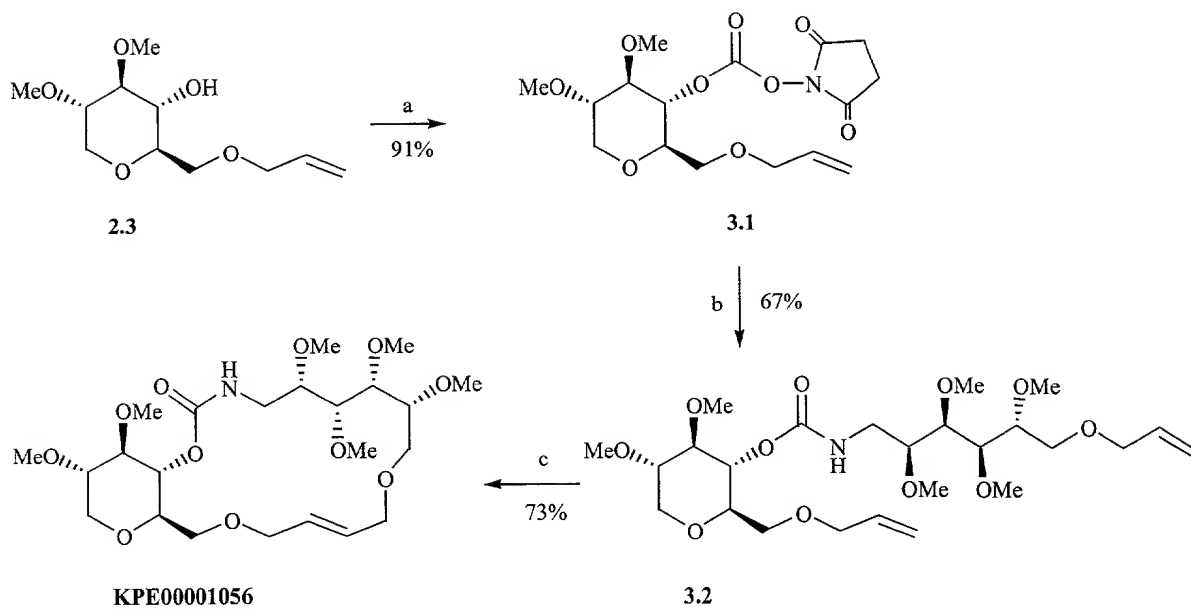
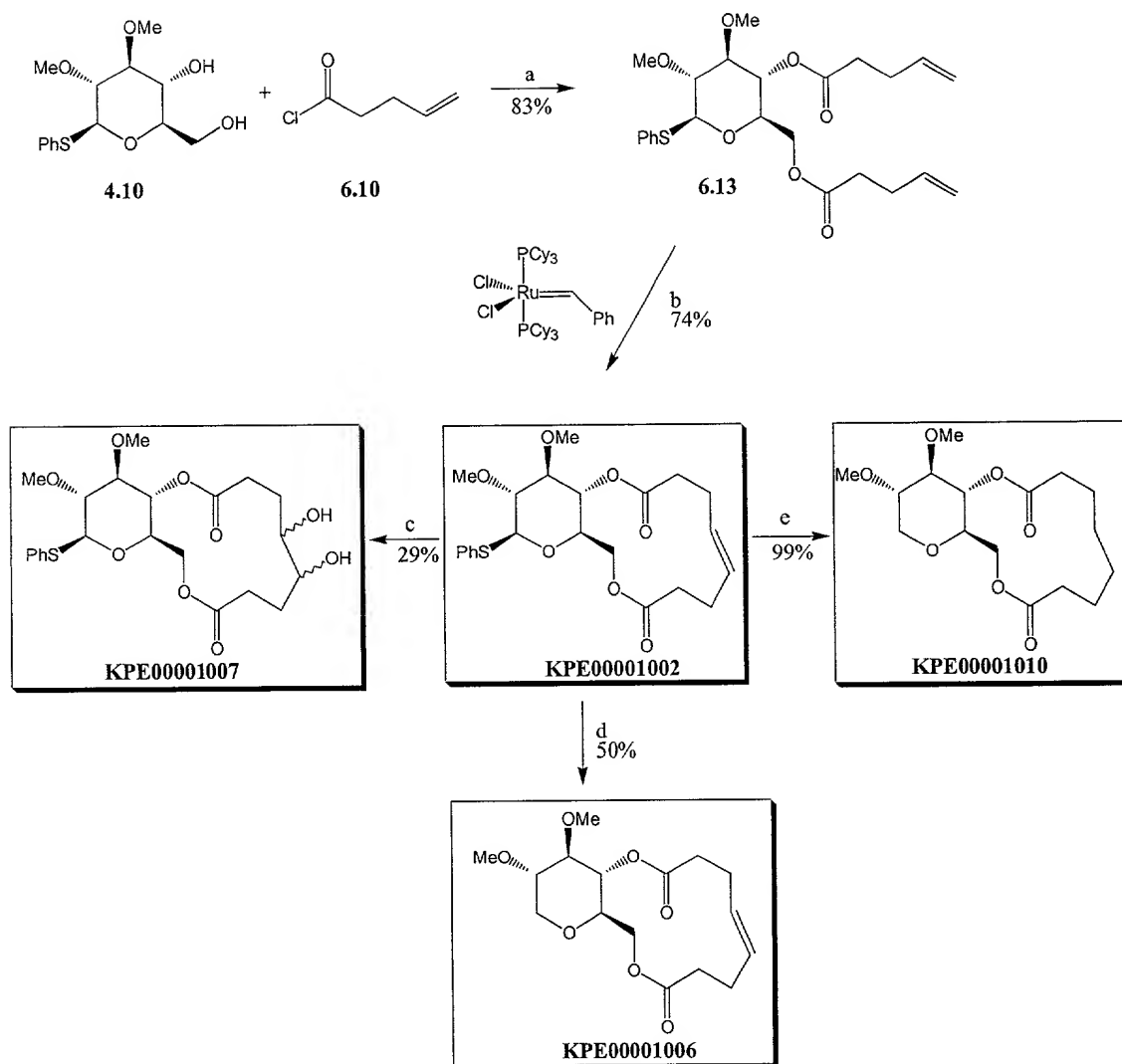
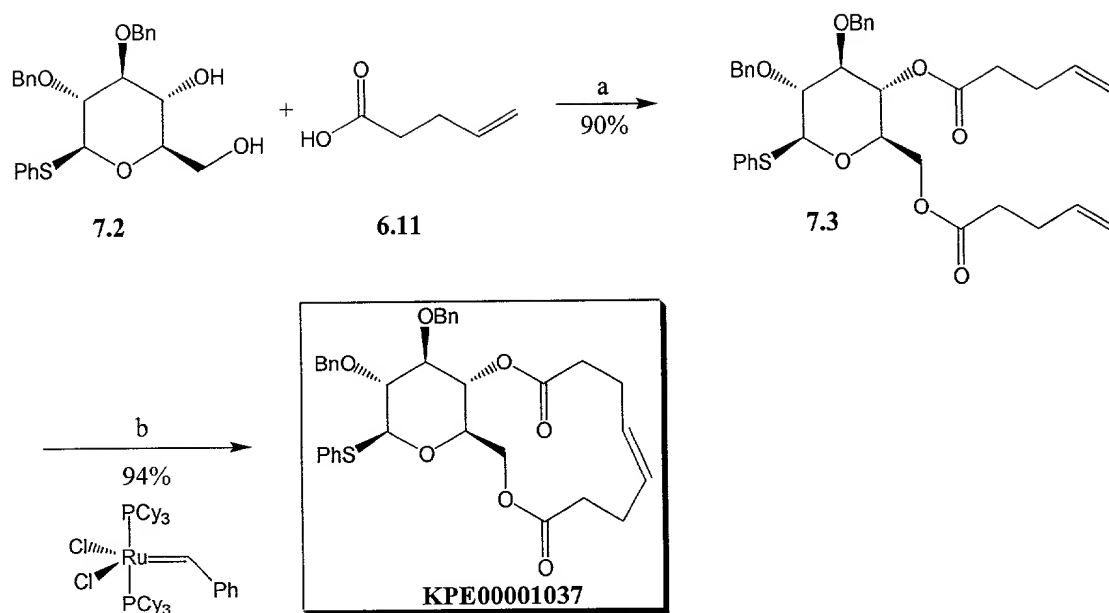


FIG. 5



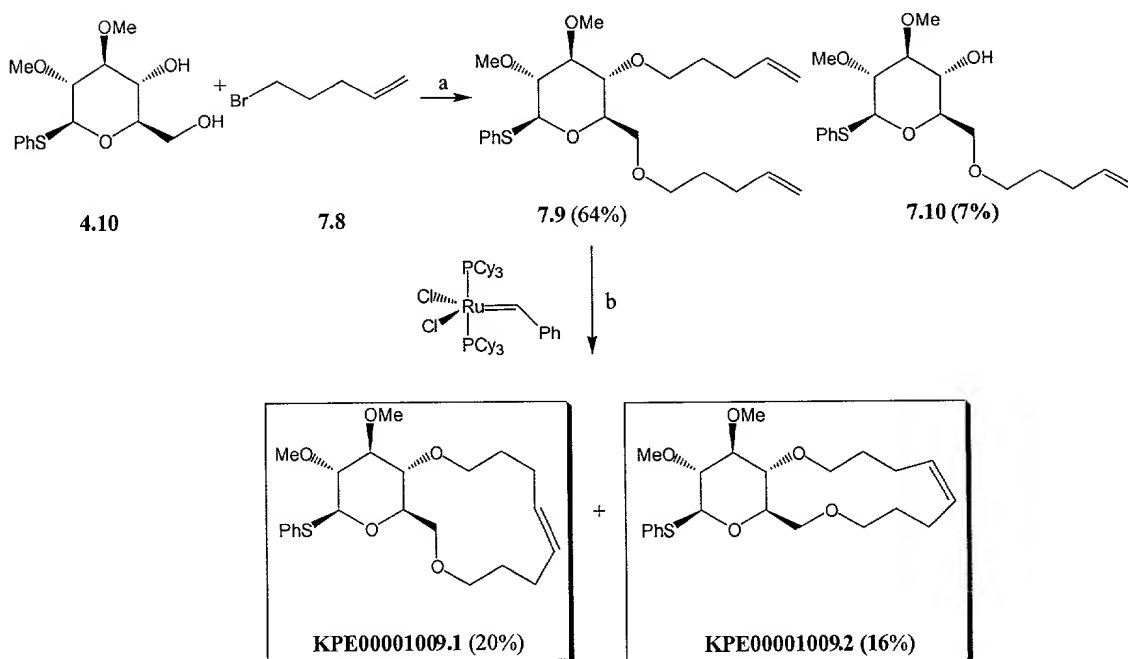
a) pyridine, DMAP,  $\text{CH}_2\text{Cl}_2$ , r.t., 18 h; b) Grubb's cat. 10 mol%,  $\text{CH}_2\text{Cl}_2$ , r.t., 48 h;  
 c)  $\text{OsO}_4$ , NMMO, *t*-BuOH, acetone/ $\text{H}_2\text{O}$ , 2.5/1, r.t., 1 h; d) Raney-Ni, EtOH, r.t., 1 h;  
 e) Raney-Ni,  $\text{H}_2$ , EtOH, r.t., 1 h.

FIG. 6



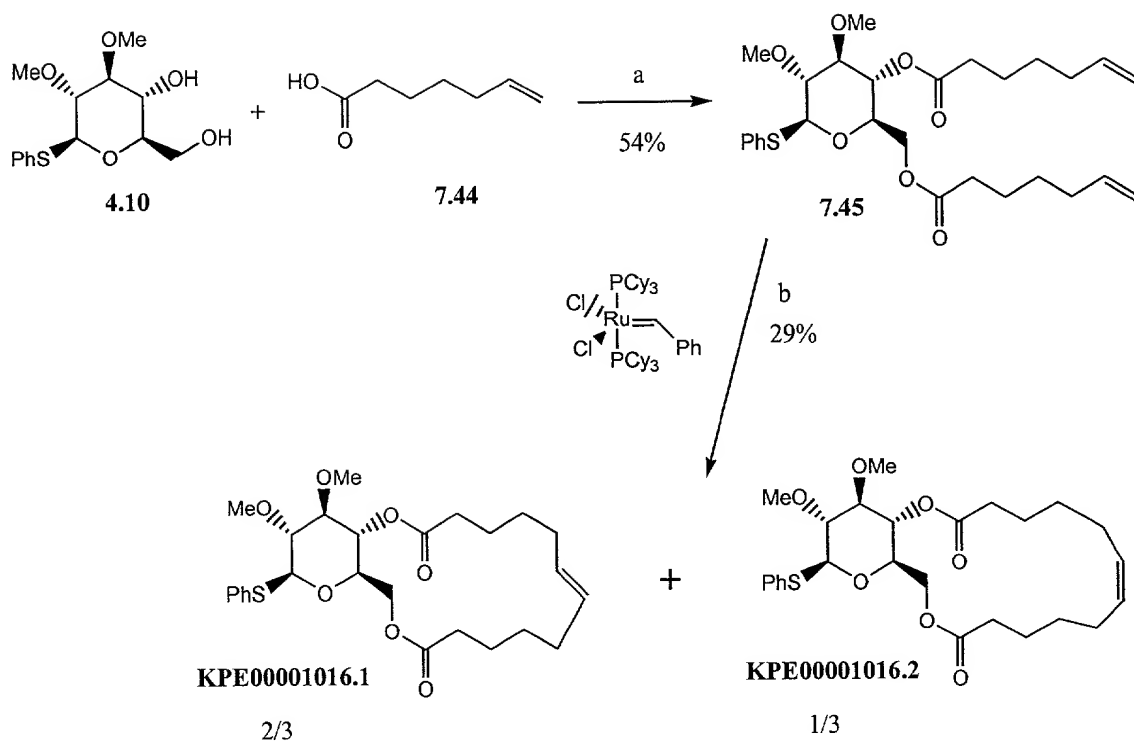
a) DIC, HOBT, DMAP,  $\text{CH}_2\text{Cl}_2$ , r.t., 120 h; b) Grubb's cat. 10 mol%,  $\text{CH}_2\text{Cl}_2$ , r.t., 95 h;

FIG. 7



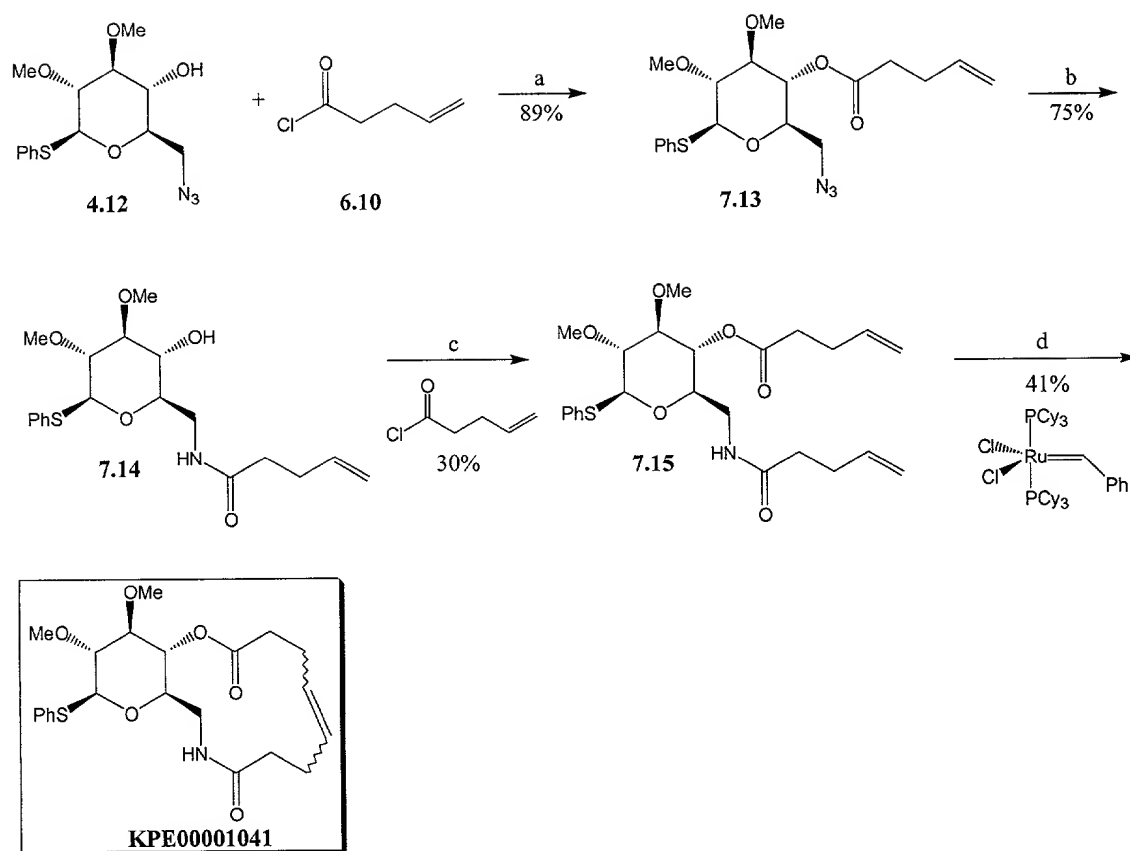
a) NaH, TBAI, THF,  $0^\circ\text{C}$  to r.t., 42 h; b) Grubb's cat. 20 mol%,  $\text{CH}_2\text{Cl}_2$ , r.t., 48 h;

FIG. 8



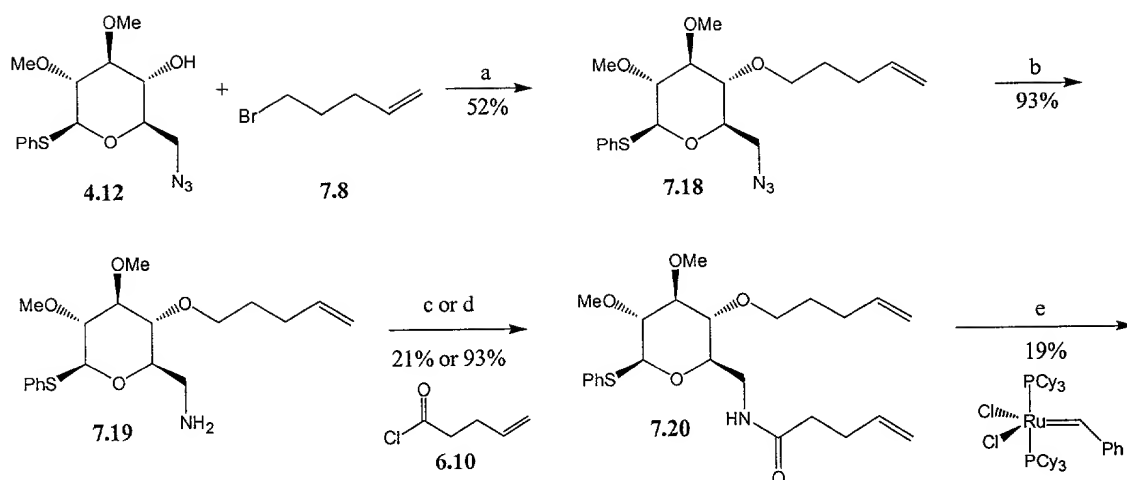
a) DIC, HOBt, DMAP, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 72h; b) Grubbs' cat. 10 mol%, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 46h.

FIG. 9



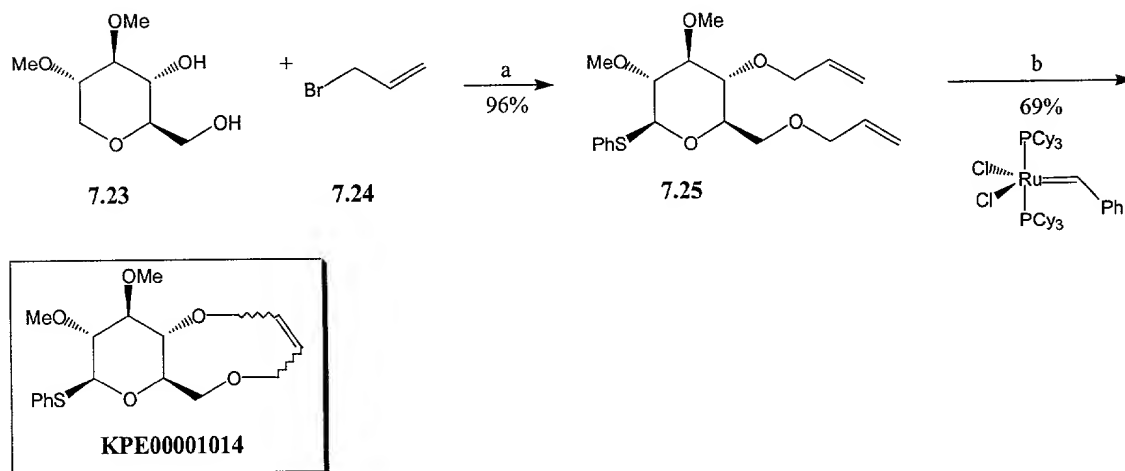
a) pyridine, DMAP, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 24 h; b) PPh<sub>3</sub> (polystyrene carrier), THF/H<sub>2</sub>O, 100/1, r.t., 48 h;  
c) Et<sub>3</sub>N, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 24 h; d) Grubbs' cat. 30 mol%, CH<sub>2</sub>Cl<sub>2</sub>, reflux, 16 h;

FIG. 10



a) NaH, TBAI, THF, 0°C to r.t., 24 h; b) PPh<sub>3</sub>, THF/H<sub>2</sub>O, 100/1, r.t., 48 h; c) DIPEA, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 19 h; d) pyridine, DMAP, CH<sub>2</sub>Cl<sub>2</sub>, 0°C to r.t., 2 h; e) Grubb's cat 20 mol%, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 18 h;

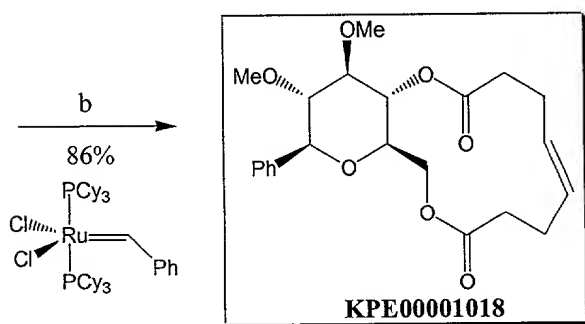
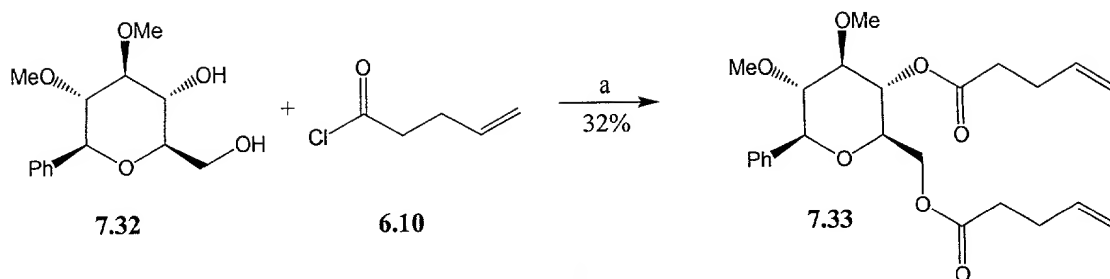
FIG. 11



a) NaH, TBAI, THF, 0°C to r.t., 18 h; b) Grubb's cat 10 mol%, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 48 h;

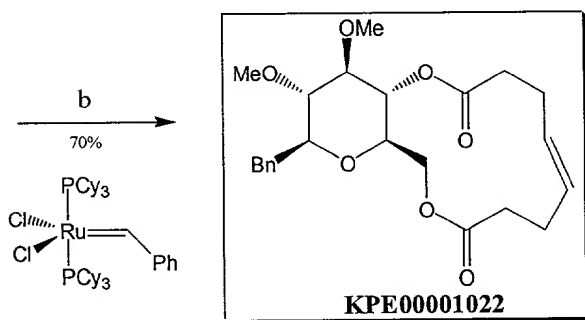
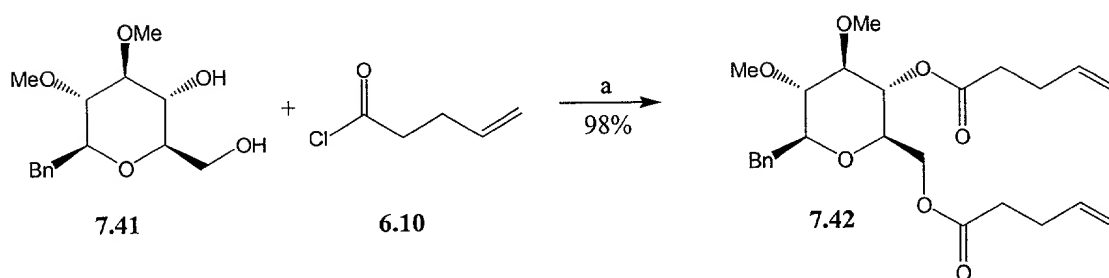
FIG. 12





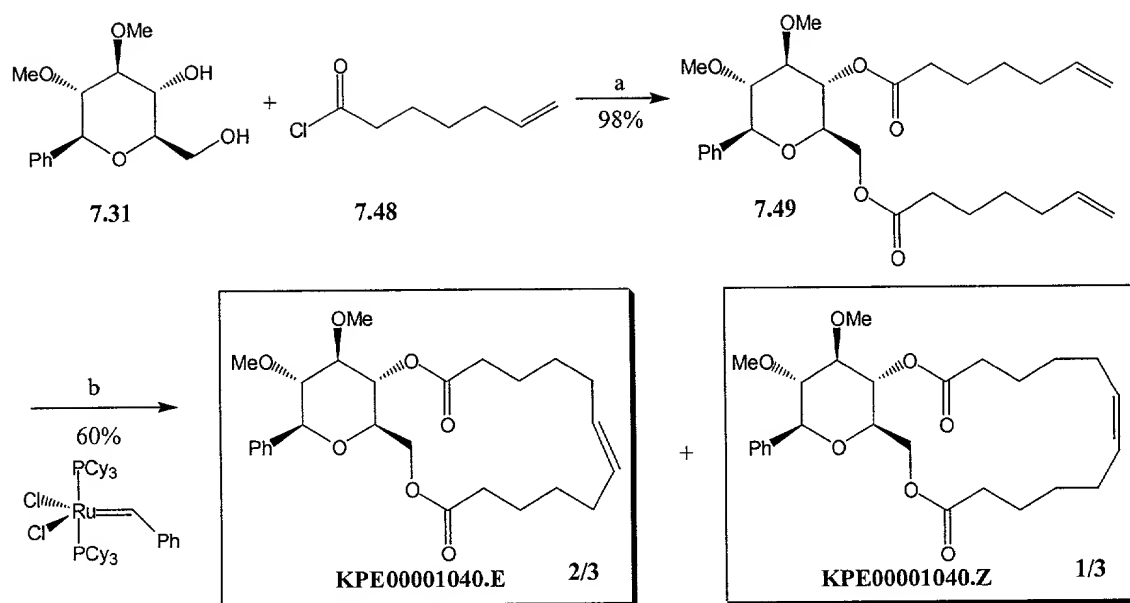
a) pyridine, DMF, 90°C, 2 h; b) Grubb's cat. 10 mol%, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 72 h;

FIG. 13



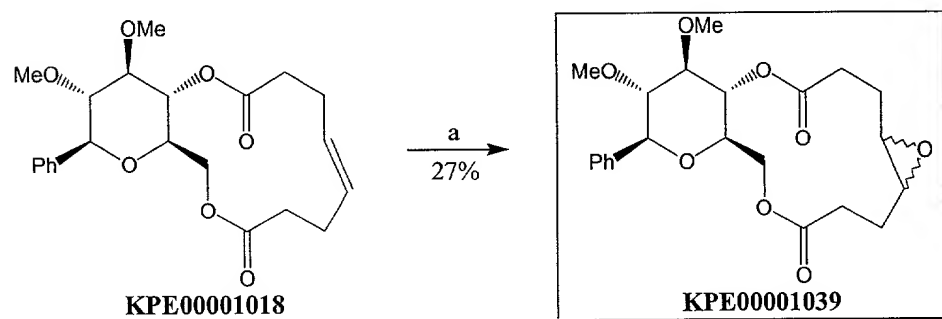
a) pyridine, DMAP, CH<sub>2</sub>Cl<sub>2</sub>, 0°C, 22 h; b) Grubb's cat. 12 mol%, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 48 h;

FIG. 14



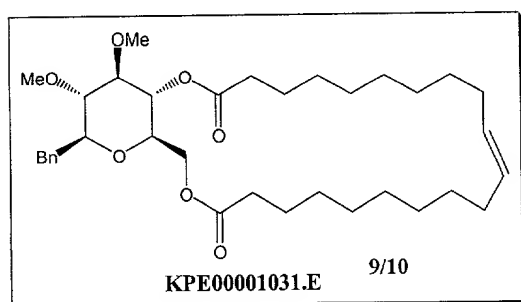
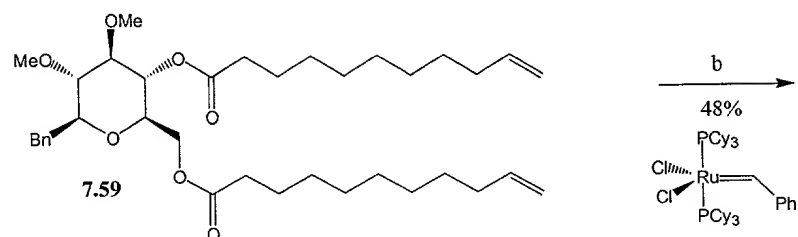
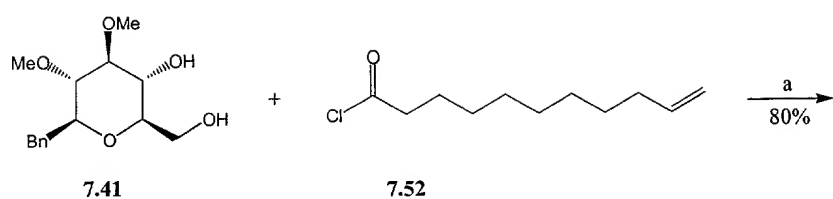
a) pyridine, DMAP, CH<sub>2</sub>Cl<sub>2</sub>, 0°C to r.t., 18 h; b) Grubb's cat. 10 mol%, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 46 h;

FIG. 15

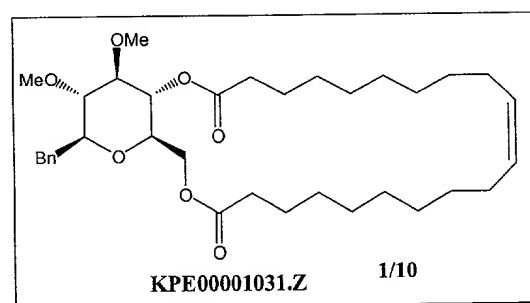


a) mCPBA, CH<sub>2</sub>Cl<sub>2</sub>, r.t., 72 h

FIG. 16



+



a) pyridine, DMAP,  $\text{CH}_2\text{Cl}_2$ ,  $0^\circ\text{C}$  to r.t., 18 h; b) Grubb's cat. 10 mol%,  $\text{CH}_2\text{Cl}_2$ , r.t., 18 h;

FIG. 17

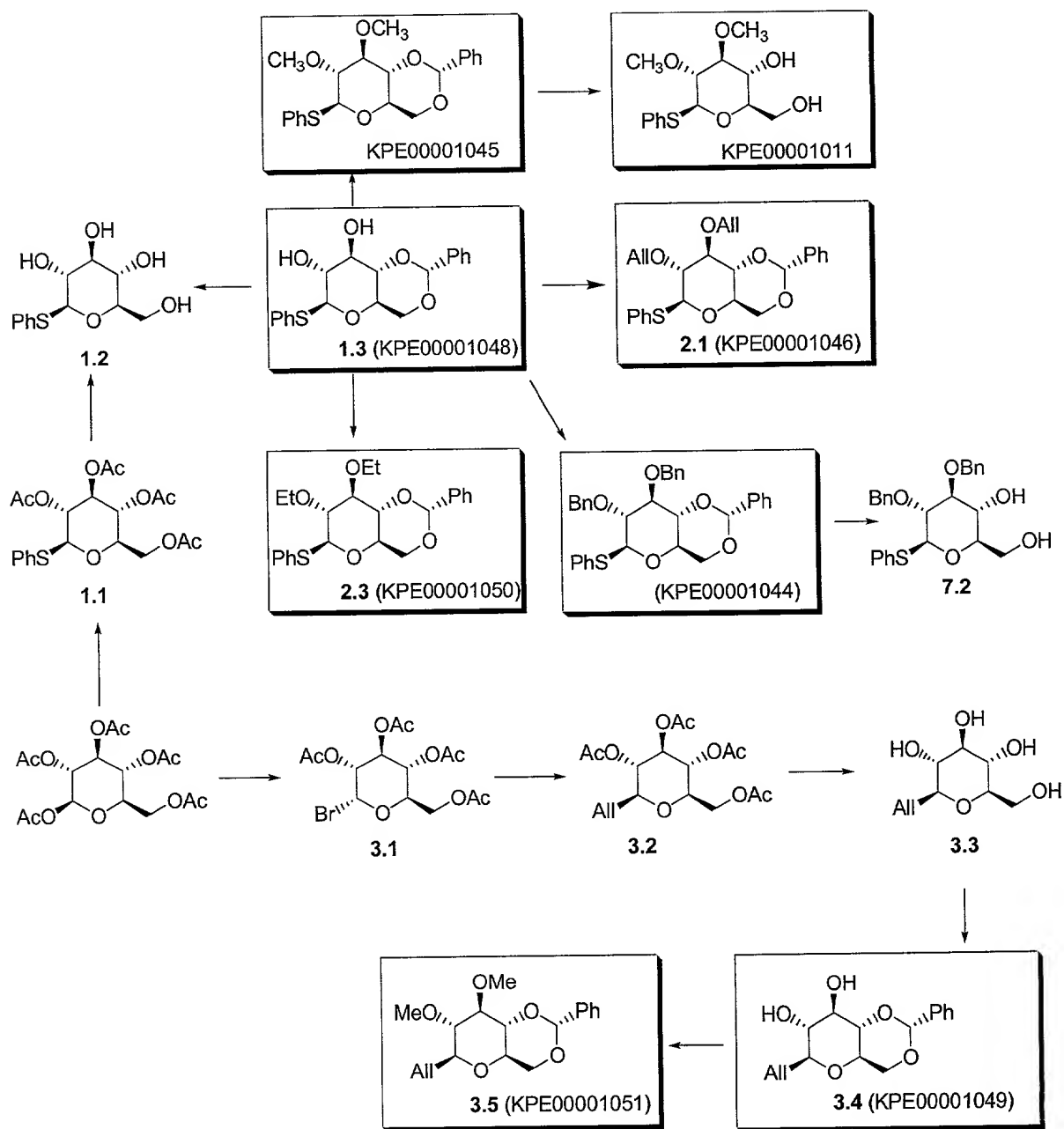


FIG. 18

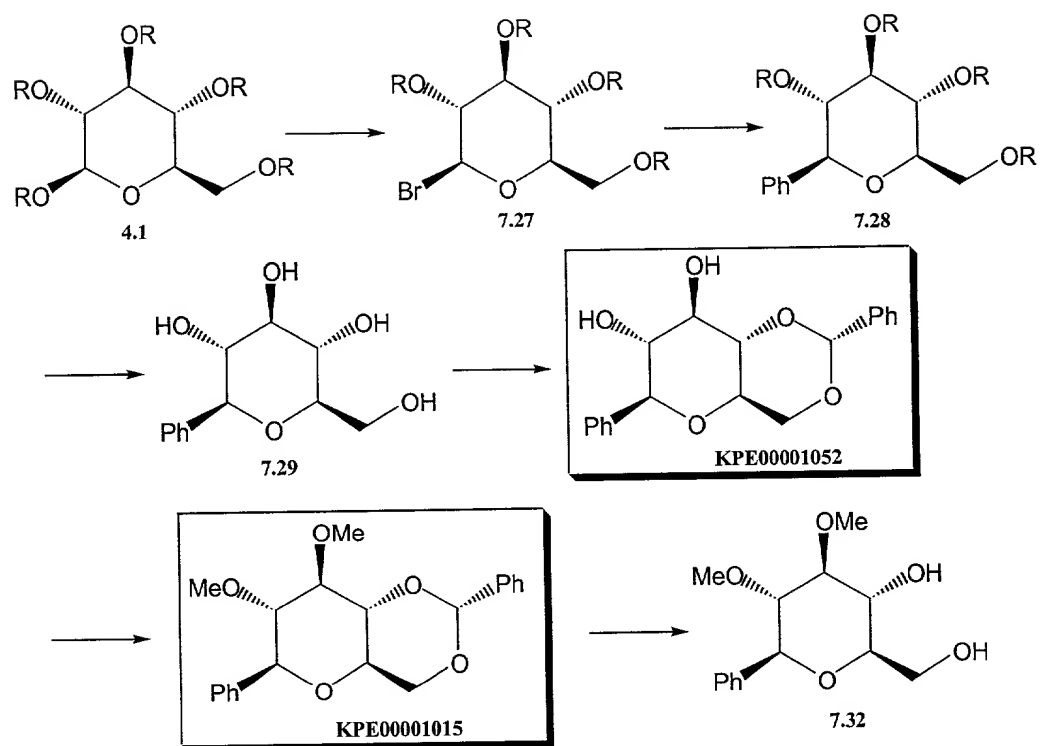


FIG. 19

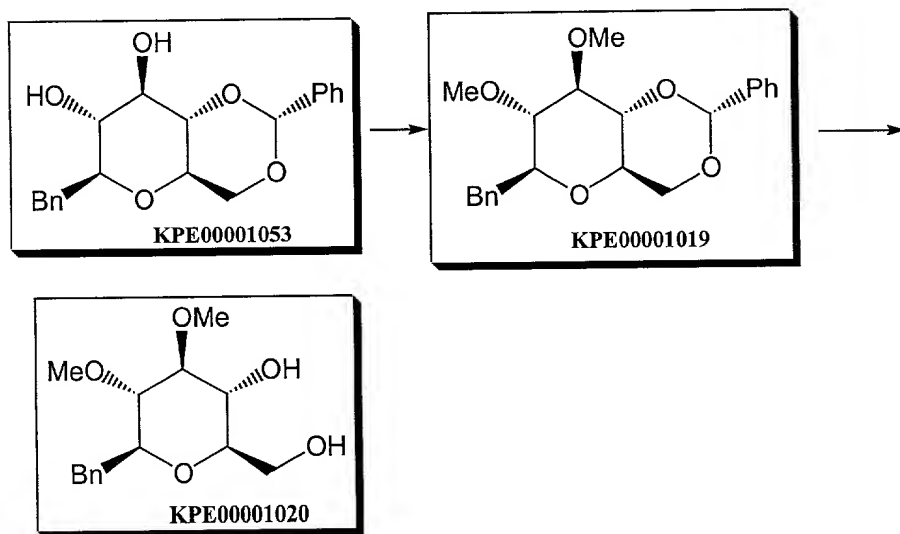
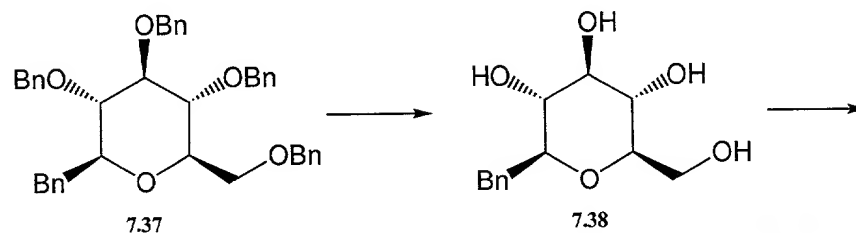
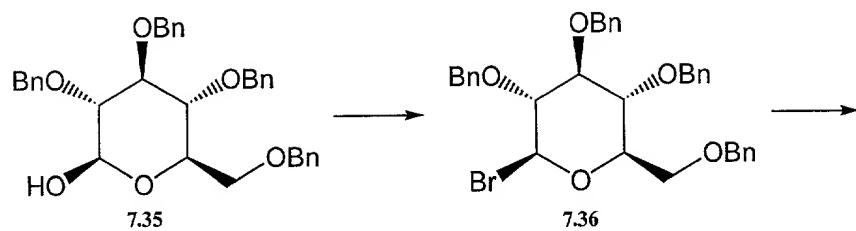


FIG. 20